



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/056,021	01/28/2002	Massimo Bechis	08719-0207	2211

7590 07/30/2003  
Finnegan, Henderson, Farabow,  
Garrett & Dunner, L.L.P.  
1300 I Street, N.W.  
Washington, DC 20005-3315

EXAMINER

MAYO III, WILLIAM H

ART UNIT PAPER NUMBER

2831

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/056,021

Applicant(s)

BECHIS ET AL.

Examiner

William H. Mayo III

Art Unit

2831

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on June 12 & May 28, 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 21-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in present Application No. 09/196,741, filed on January 28, 2002.

### ***Specification***

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The abstract of the disclosure is objected to because it contains language such as "A system ... is described", which is improper language for the abstract.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 2831

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (15), (2), and (inside 40) of section 371(c) of this title before the invention thereof by the applicant for patent.

5. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

6. Claims 21-26, 32-37, and 40-41 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakahara et al (Pat Num 6,354,087, herein referred to as Nakahara). Nakahara discloses a method and apparatus (Figs 1-36) by which a high temperature superconductor can be cooled to a lower temperature easily and conveniently at a low cost (abstract). Specifically, with respect to claim 21, Nakahara discloses a system (Figs 11-12) for transporting electric energy in superconductivity conditions (Col 1, lines 5-8), comprising a superconducting cable (50) including superconducting material (Col 2, lines 50-58), and a cryogenic plant (15) for cooling said superconducting cable (50) below the critical temperature of said material (Cols 12-13, lines 65-68 & 1-2, respectively), comprising a circuit (34, 15a) for circulating from and to the superconducting cable (50), a first refrigerating fluid (liquefied air) having a first predetermined temperature lower than the critical temperature of the superconducting material (Col 14, lines 9-11), a refrigerating circuit (at 10) for cooling a second

Art Unit: 2831

refrigerating fluid (helium gas) to a second predetermined temperature lower than the temperature of the first refrigerating fluid (liquefied air, Col 13, lines 14-22), a heat exchange unit (31) for effecting a heat exchange between said first and second refrigerating fluids (liquefied air and helium, Col 14, lines 7-9), wherein the heat exchange unit (31) comprises a storage unit (inside 40) of a third refrigerating fluid (cooled liquefied air) having a third predetermined temperature lower than the temperature of the first- refrigerating fluid (liquefied air), said third refrigerating fluid (cooled liquefied air) being in heat exchange relationship with said first and second fluids (liquefied air and helium gas) through pipes (31 & 33). With respect to claim 22, Nakahara discloses that the storage unit (inside 40) has a predetermined volume adapted to contain a quantity of said third refrigerating fluid (cooled liquefied air) corresponding to the thermal consumption of said superconducting cable (50) for at least two hours in the absence of a heat exchange with said second refrigerating fluid (helium gas, Col 14, lines 37-43). With respect to claim 23, Nakahara discloses that the refrigerating circuit (at 10) for cooling the second refrigerating fluid (helium gas) comprises at least one refrigerating unit (10) provided with at least one heat: exchanger (12) in heat exchange relationship with said storage unit (inside 40). With respect to claim 24, Nakahara discloses that the refrigerating circuit (at 10) for cooling the second refrigerating fluid (helium gas) comprises at least one refrigerating unit (10) in heat exchange relationship with the storage unit (inside 40) and with said first fluid (liquefied air), wherein the refrigerating unit (10) is positioned upstream of said superconducting cable (50) and the storage unit (inside 40) is in parallel with said refrigerating unit (10,

Art Unit: 2831

Fig 12). With respect to claim 25, Nakahara discloses that the storage unit (inside 40) comprises a storage tank (inside 40) structurally independent from said refrigerating unit (10, Fig 5). With respect to claim 26, Nakahara discloses that the heat exchange unit (40) further includes at least one heat exchanger (top and bottom 15b) immersed in the third refrigerating fluid (cooled liquefied air) stored in said storage unit (inside 40), said at least one heat exchanger (top and bottom 15b) being provided with a fluid flow path for the tube side circulation of said first refrigerating fluid (liquefied air) by a circulating pipe (30). With respect to claim 32, Nakahara discloses that the first refrigerating fluid may be liquid nitrogen (Col 2, lines 40-45), which inherently has a temperature that is between 63 and 70K. With respect to claim 33, Nakahara discloses that the second refrigerating fluid is gaseous helium (Col 13, lines 15-22), which inherently has a pressure ranging between 1 and 20 bar, and has a second predetermined temperature that is between 40 and 55K. With respect to claim 34, Nakahara discloses that the third refrigerating fluid may be subcooled liquid nitrogen (Col 2, lines 40-45), which inherently has a temperature that is between 63 and 69K. With respect to claim 35, Nakahara discloses a cryogenic plant (15) for cooling a superconducting cable (50) including superconducting material below the critical temperature of said superconducting material (Cols 12-13, lines 65-68 & 1-2, respectively) comprising a circuit (34, 15a) for circulating a first refrigerating fluid (liquefied air) having a first predetermined temperature from and to the superconducting cable (50, Col 14, lines 9-17), a refrigerating circuit (at 10) for cooling a second refrigerating fluid (helium gas) to a second predetermined temperature lower than the temperature of the first refrigerating

Art Unit: 2831

fluid (Col 14, lines 9-11), a heat exchange unit (40) for effecting a heat exchange between said first and second refrigerating fluids (liquefied air and helium gas), wherein the heat exchange unit (40) is provided with a storage unit (inside 40) of a third refrigerating fluid (cooled liquefied air) has a third predetermined temperature lower than the temperature of the first refrigerating fluid (liquefied air), wherein the third refrigerating fluid (cooled liquefied air) is heat exchange relationship with said first and second fluids (liquefied air and helium gas) through pipes (31 & 33). With respect to claims 36-37, Nakahara discloses that the storage unit (inside 40) has a predetermined volume adapted to contain a quantity of said third refrigerating fluid (cooled liquefied air) at a predetermined temperature corresponding to the thermal workload of said refrigerating circuit (at 10) for at least two hours in the absence of a heat exchange with said second refrigerating fluid (helium gas, Col 14, lines 37-43). With respect to claim 40, Nakahara discloses that a method for cooling in continuous a superconducting cable (50) including superconducting material below the critical temperature of said superconducting material (Col 2, lines 50-58), comprising the steps of circulating a first refrigerating fluid (liquefied air) from and to the superconducting cable (50), cooling the first refrigerating fluid to a first predetermined temperature by means of a second refrigerating fluid (helium gas) having a second predetermined temperature lower than the temperature of the first refrigerating fluid (liquefied air), wherein the cooling step of the first refrigerating fluid (liquefied air) is effected by means of the further steps of providing a cryogenic bath of a third refrigerating fluid (cooled liquefied air) in a storage area (inside 40), cooling the third refrigerating fluid to a third predetermined temperature

Art Unit: 2831

lower than the temperature of the first refrigerating fluid (liquefied air) by means of said second fluid (helium gas, Col 14, lines 8-17), cooling the first refrigerating fluid (liquefied air) by means of the third refrigerating fluid (cooled liquefied air) stored in the cryogenic bath (inside 40). With respect to claim 41, Nakahara discloses that the third refrigerating fluid (cooled liquefied air) is cooled to an intermediate temperature between the temperatures of the first and second refrigerating fluids (liquefied air and helium gas, Col 14, lines 8-17).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).



Art Unit: 2831

9. Claims 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakahara (Pat Num 6,354,087) in view of Asztalos et al (Pat Num 3,882,687, herein referred to as Asztalos). Nakahara discloses a method and apparatus (Figs 1-36) by which a high temperature superconductor can be cooled to a lower temperature easily and conveniently at a low cost (abstract) as applied above to claims 21 & 25.

Specifically, with respect to claim 29, Nakahara discloses that the heat exchange unit (40) comprises at least one heat exchanger (15b) provided with a fluid flowpath for circulating gas phase including vapors (i.e. cooled helium) of the third refrigerating fluid (cooled liquefied air, Col 12, lines 61-67).

However, Nakahara doesn't necessarily disclose the system comprising an auxiliary circuit for maintaining the third refrigerating fluid at a predetermined temperature (claim 27), nor the auxiliary circuit comprising at least one vacuum pump connected to the storage unit by means of ducts, wherein at least one heat exchanger unit is interposed between the vacuum pump and the heat exchanger unit (claim 28), nor the system further comprising container for storing the third refrigerating fluid being selectively connected to the storage unit of the heat exchange unit by means of at least one duct (claims 30-31).

Asztalos teaches a method and apparatus (Fig 1) for cooling a superconductive cable which overcomes the disadvantages of prior cooling devices of the prior art (Col 2, lines 3-7). Specifically, with respect to claim 27, Asztalos teaches a system (Fig 1) comprising an auxiliary circuit (14, 15, 16, ) for maintaining the third refrigerating fluid in a predetermined temperature (Col 5, lines 25-50). With respect to claim 28, Asztalos

Art Unit: 2831

teaches that the auxiliary circuit (14, 15, 16) comprises at least one vacuum pump (16) and a heat exchanger unit (15') connected to a storage unit (14) by means of ducts (15 & 13), wherein the at least storage unit (14) is interposed between the vacuum pump (16) and the heat exchanger unit (15'). With respect to claims 30-31, Asztalos teaches that the system (Fig 1) further comprises a container (17) for storing a refrigerating fluid (Fig 1), wherein the container (17) is connected to the storage unit (14) of the heat exchanger (15') by means of one duct (15).

With respect to claim 27 and 29-31, it would have been obvious to one having ordinary skill in the art of cables at the time the invention was made to modify the system of Nakahara to comprise the auxiliary circuit configuration as taught by Asztalos because Asztalos teaches that such a configuration provides a system for cooling a superconductive cable which overcomes the disadvantages of prior cooling devices of the prior art (Col 2, lines 3-7).

10. Claims 38-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakahara (Pat Num 6,354,087). Nakahara discloses a method and apparatus (Figs 1-36) by which a high temperature superconductor can be cooled to a lower temperature easily and conveniently at a low cost (abstract). With respect to claims 38-39, Nakahara discloses that the storage unit (inside 40) has a predetermined volume.

However, Nakahara doesn't necessarily disclose the volume being 2000 liters (claim 17), nor the volume being 12000 liters (claim 18).

It would have been an obvious matter of design choice to modify the storage tank of Nakahara to have a volume of 2000 liters or 12000 liters, since the applicant has not

Art Unit: 2831

disclosed that such a modification solves any stated problems or is for any particular purpose and it appears that Nakahara would perform equally well with the modification and since such a modification would have involved a mere change in size of a component and a change of size is generally recognized as being within the ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

### ***Response to Arguments***

11. Applicant's arguments, see paper number 7, filed June 12, 2003, with respect to the rejection(s) of claim(s) 1-20 under 35 USC 102(e) & 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. The newly submitted claims 21-41, which were submitted prior to the rejection, but not matched with the file, has been entered and the new rejection with respect to claims 21-41 as detailed above, has been done.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. They are Graneau et al (Pat Num 3,646,243), Hitachi Cable (JP Pat Num 11-83248), Hildebrandt (Pat Num 3,932,158), Asztalos (Pat Num 3,878,691), Mehra et al (Pat Num 5,521,264), all of which discloses systems for cooling.

13. Based on the new rejection with respect to claims 21-41, this action is non-final.


Art Unit: 2831

***Communication***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to William H. Mayo III whose telephone number is (703) 306-9061. The examiner can normally be reached on M-F 8:30am-6:00 pm (alternate Fridays off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard can be reached on (703) 308-3682. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

  
WHM III  
July 20, 2003